Space Weather Forecast

Issued on Saturday, 06 May 2023 at 13:30 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: R1-R2 Radio Blackouts throughout. Low confidence coronal mass ejection arrivals day 2 (07 May) bring a likelihood of G1-G2 Minor/Moderate storms with a chance of G3/Strong Storms.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: One Moderate class flare was observed from the middle sunspot in the northeast disc. This is one of a trio of sunspots regions that appear interconnected in magnetic imagery, however all three sunspot appear to have stabalised somewhat with no notable growth ongoing. The only growth is some small development around the leader of a small and simple sunspot in the southeast disc. There are three further, but magnetically simple spots. No Earth-directed coronal mass ejections (CMEs) have been observed in this period.

Solar Wind / Geomagnetic Activity: The solar wind was indicative of the arrival of a slow CME, but with some magnetic material, followed by a transition into faster winds from a coronal hole. Observed speeds initially at background, but showed a small but sudden rises with the CME arrival just after midnight. Speeds then erratically climbed to be elevated at 500-550 km/s by midday. The total magnetic field strength also increased from background at the same becoming strong with a strongly negative (southward) north-south component for a time. This rotated to be strongly positive (northward), before the strength of the magnetic field gradually eased to Moderate levels. The north-south component then became variable. Geomagnetic activity was initially Quiet (Kp0-1), but become Unsettled to Active (Kp3-4) from 06/0000 UTC, with one G2 Moderate storm (Kp6) interval observed 06/0300-0600 UTC. This potentially brought brief glimpses of aurora to northern Scotland or similar latitudes.

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) was at background with no solar radiation storms observed.

Four-Day Space Weather Forecast Summary

Solar Activity: Moderate activity is expected through the next four days, mainly from the regions in the northeast of the visible disc.

Solar Wind / Geomagnetic Activity: Two CMEs which left the Sun on 04 and 05 May respectively, are forecast to arrive on day 2 (07 May), perhaps concurrently, with a risk of effects into 08 May. These are low confidence, due to low confidence with their speeds, how they interact and uncertainties with how much material will be within them. Current elevated solar winds are due to the combined influence of a fast wind from a coronal hole and the CME arrival early on day 1 (06 May). These elevated winds are expected to gradually ease through the period, once any CME influence has passed. Quiet to Active geomagnetic conditions, with a likelihood of further G1 Minor Storm intervals are expected at first day 1 (06 May). Any CME arrivals are then expected to bring a spell of G1-G2 Minor to Moderate storms, with a chance of G3 Strong storms. This could lead to visible aurora to parts of northern England and similar latitudes, however this is very low confidence. This risk recedes later day 3 and day 4 (07 and 08 May) with activity becoming mainly Quiet to Unsettled.

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy

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protons) is most likely to persist at background levels with no solar radiation storms occurring.

Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	Yes	60	70	70	20
Strong	G3	No	5	25	20	1
Severe	G4	No	1	2	2	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	Yes	70	70	70	70
Very Active	R3 to R5 X	No	15	15	15	15

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	5	5	5	5
Very Active	≥ S3 *	No	1	1	1	1

* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)

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